WPDES Nutrient Management Plan
Kinnard Farms Inc.
No. WI-0059536-02-0
January 01, 2012

Background

This Nutrient Management Plan (NMP) is prepared for Kinnard Farms Inc. located near Casco, in the township of Lincoln, Kewaunee County, for the crop years of 2011-2016 from harvest to harvest (November 1 to October 31). The goal of this NMP is to ensure that Kinnard Farms Inc. maintains compliance with all applicable criteria contained in Ch. NR 243, Wis. Admin. Code and Wisconsin Nutrient Management Standard Code 590 and its companion Technical Note.

The nutrient management planner for Kinnard Farms Inc., Nathen Nysse (CCA) of Polenske Agronomic Consulting Inc. 2121 East Ridge Haven Lane, Appleton, WI 54913, will develop the required information for Kinnard Farms Inc. to submit to the appropriate WDNR offices.

This narrative will demonstrate compliance with nutrient management plan requirements contained in Administrative Code NR 243, WPDES permit, and NRCS Technical Standard 590. Specifically, the nutrient management plan will document how the dairy will manage organic manures, nutrients, and contaminated collected runoff through sound land management practices. It is the intent of the dairy to follow best management practices to safeguard the environment and to maximize the nutrient value of the animal manures.

Animal units – 2012 to 2016.

Expected numbers of animal units for first year of permit and remaining permit term (next 4 yrs)
The following table provides the current animal numbers on farm, and expected animal numbers on the farm over the permit term. Please be advised that future years are an estimate and actual animal numbers may vary from these values. Kinnard Farms Inc. actual animal numbers will be described in annual NMP updates and NMP annual reports. See section 3.0 for DNR form 340025a.

Total animals and animal units

Year	Total Herd Size (Milk/Dry + Heifers/Calves)	Total Animal Units
2012	2620+1025	4796
2013	2620+1025	4796
2014	3980+1400	6752
2015	4630+1400	7662
2016	5800+1250	8710

- *Numbers will vary because the farm is currently increasing cow numbers to meet final estimates.

Annual manure and process wastewater production estimates – 2012-2016.

Expected amounts and types of manure and process wastewater produced on annual basis
Please refer to Section 3.0 of this narrative for calculations/analysis for table values (Table 4).

Expected manure produced

Year	Total Liquids	Total Solids	Note:
2012	31,597,701 gallons	11,935 tons	
2013	43,998,983 gallons	12,865 tons	
2014	59,641,360 gallons	8,472 tons	
2015	61,569,623 gallons	6,228 tons	
2016	77,828,110 gallons	1,506 tons	

Amount of manure and process wastewater to be land applied.

Please refer to Section 3.0 of plan for calculations/analysis for table value and Section 3.0 of plan for land application schedules for specific fields.

Production and Applicable Volumes.

Year	Total Liquids created (gals)	Total Liquids planned (gals)	Total Solids created (tons)	Total Solids planned (tons)
2012	34,692,338	33,956,306	4,209	11,935
2013	34,692,338	43,998,893	4,209	12,865
2014	51,570,850	59,641,360	383	8,472
2015	59,162,850	61,569,623	767	6,228
2016	68,943,938	77,828,110	1,437	1,506

- **** Additional land will be added as the farm continues to add cows. These columns will be adjusted.**

Other sources of nutrients to be land applied (NRCS 590 requirement).

Kinnard Farms Inc. does not plan to use other methods of use, disposal, or distribution of manure or process wastewater. The generation and land application numbers above include the 1,950,000 gallons of liquid leachate, precipitation runoff and wash water that will be pumped into the Waste Storage Facility.

Anticipated frequency and method(s) of land application.

Kinnard Farms Inc. anticipates applying liquid manure according to the following schedule: Land applications will occur approximately 4-5 times per year for 7-21 day periods March – November. Spreading by direct injection from tankers and hoses, or incorporated within 48 hours of surface application in non-SWQMA or immediately incorporated in SWQMA will occur in spring before planting and after harvest of crops in the fall. Surface applications may also occur on alfalfa fields between cuttings. Liquid and solid manure spread on Kinnard Farms Inc. will be hauled by a custom applicator or the dairy itself. There will be no planned winter spreading of liquid manures, dilute wastewater, or other forms of liquid manure. Some solid bed-pack shall be land applied or stacked on an approved temporary storage site. Please refer to Section 3.0 (SNAP PLUS spreading reports) of this NMP for land application schedules for specific fields. Planned manure applications within a given crop year may change season of application as necessary i.e. a field that is planned to receive manure in spring may instead receive manure in fall. Please also refer to Section 2.0 for map and Section 5.0 for field verification procedures that will be followed to verify areas of fields that are not prohibited from manure spreading and NR 243 or NRCS 590 setback requirements are followed.

Total acreage available (by landowner) for land application owned, rented or in 'agreements'.

The table below summarizes this information. Please refer to Section 3.0 of plan for more information related to land base documentation. The farm has a total of approximately 5,288.13 acres of available land after various restricted areas have been accounted for.

Total land application acres available – 5,167.06 Acres Spreadable

Acres owned – 1,791.99 Acres **Rented or Acres in agreements – 3,375.06 Acres**

Field Name	Acres Owned	Acres Rented	Verbal Agreement	Written Agreement	Shared Land	Length of Contract
AN-1	37.37			N/A	No	N/A
BD-1.3		33.50		Yes	No	3
BD-2.4		36.67		Yes	No	3
BD-5		30.02		Yes	No	3
BDF-01		17.11		Yes	No	3
BDF-02		16.80		Yes	No	3
BDF-03		45.50		Yes	No	3
BDF-04		18.24		Yes	No	3
BDF-05		17.50		Yes	No	3
BDF-06		4.70		Yes	No	3
BDF-07		4.70		Yes	No	3
BDF-08		4.30		Yes	No	3
BDF-09		4.20		Yes	No	3
BDF-10		3.63		Yes	No	3
BDF-11		2.51		Yes	No	3
BDF-12		7.25		Yes	No	3
BDSR-1		8.10		Yes	No	3
BDSR-2		11.50		Yes	No	3
BDSR-3		8.90		Yes	No	3
BDSR-4		6.60		Yes	No	3
BE-1			13.46	Yes	Yes	3
BLE-1		17.50		Yes	No	3
BLE-2		7.40		Yes	No	3
BLE-3		3.20		Yes	No	3
BLE-4		2.70		Yes	No	3
BLE-5		2.90		Yes	No	3
BLE-6		2.65		Yes	No	3
BLE-7		2.95		Yes	No	3

BLE-8		12.06		Yes	No	3
BLH-09-12		28.49		Yes	No	3
BLN-13		7.05		Yes	No	3
BLN-14		6.30		Yes	No	3
BLN-15		6.00		Yes	No	3
BLN-16		6.59		Yes	No	3
BLN-17		10.24		Yes	No	3
BLN-18		26.75		Yes	No	3
BOONERS		4.49		N/A	No	N/A
BUR-1	56.62			N/A	No	N/A
C-1	10.60			N/A	No	N/A
C-2	38.50			N/A	No	N/A
CD-1		16.60		Yes	No	3
CD-2		36.60		Yes	No	3
CDE		37.66		Yes	No	3
CJ-1		20.52		Yes	No	3
CJ-2		69.16		Yes	No	3
CT-1		7.50		Yes	No	3
DD-1		31.76		Yes	No	3
DD-2		33.69		Yes	No	3
DD-3		24.40		Yes	No	3
DD-4		17.07		Yes	No	3
DEB	57.10			N/A	No	N/A
DEC		30.20		Yes	No	3
(b) (6) 01		24.90		Yes	No	3
(b) (6) 02		25.10		Yes	No	3
(b) (6) 03		10.10		Yes	No	3
(b) (6) 04		14.40		Yes	No	3
(b) (6) 05		19.70		Yes	No	3
(b) (6) 06		7.20		Yes	No	3
(b) (6) 07		22.93		Yes	No	3
(b) (6) 08		12.55		Yes	No	3
(b) (6) 09		3.51		Yes	No	3
(b) (6) 10		7.12		Yes	No	3
(b) (6) 11		7.80		Yes	No	3
(b) (6) 12		14.44		Yes	No	3
(b) (6) 14		20.48		Yes	No	3
(b) (6) 15		6.07		Yes	No	3
DKH-1		2.80		Yes	No	3
DKH-2		3.30		Yes	No	3
DKH-3		2.80		Yes	No	3
DKH-4		6.40		Yes	No	3
DKH-5		5.60		Yes	No	3
DKH-6		6.90		Yes	No	3
DKH-7		22.00		Yes	No	3
DKH-8		34.60		Yes	No	3
DKS		60.46		Yes	No	3
DNG	36.30			N/A	No	N/A

DP-1		21.26		Yes	No	3
DPH-1		25.43		Yes	No	3
DSB	37.80			N/A	No	N/A
DUV	29.37			N/A	No	N/A
EH-1	73.41			N/A	No	N/A
EVER-1		38.34		Yes	No	3
EVER-2		16.01		Yes	No	3
FR-1	21.19			N/A	No	N/A
FR-1R	6.42			N/A	No	N/A
FR-2	12.45			N/A	No	N/A
FR-3	28.23			N/A	No	N/A
FR-4	5.50			N/A	No	N/A
FR-5	39.17			N/A	No	N/A
FRE		15.06		Yes	No	3
FT-1	23.50			N/A	No	N/A
FT-2	2.55			N/A	No	N/A
FT-3	2.54			N/A	No	N/A
FT-4	2.49			N/A	No	N/A
FT-5	5.66			N/A	No	N/A
FT-6	2.06			N/A	No	N/A
FTB		51.18		Yes	No	3
GP		35.80		Yes	No	3
GT-1	19.29			Yes	No	3
GT-2	14.12			Yes	No	3
GT-3	21.19			Yes	No	3
GTE-1		19.71		Yes	No	3
GTN-1		54.93		Yes	No	3
GTN-2		8.01		Yes	No	3
HD-1		10.21		Yes	No	3
HD-2		9.18		Yes	No	3
(b) (6) 1	34.70			N/A	No	N/A
(b) (6) 2	4.78			N/A	No	N/A
(b) (6) 3	8.30			N/A	No	N/A
JK-1	68.97			N/A	No	N/A
JK-2	65.00			N/A	No	N/A
JK-3	14.85			N/A	No	N/A
JK-4	8.33			N/A	No	N/A
LT		45.31		Yes	No	3
MA-1E	17.01			N/A	No	N/A
MA-1W	18.42			N/A	No	N/A
MA-3	38.54			N/A	No	N/A
MEN	37.43			N/A	No	N/A
MES	35.83			N/A	No	N/A
MIN		37.60		Yes	No	3
MIS-1	57.80			N/A	No	N/A
MJ-J-1,J-2			31.37	Yes	Yes	3
MJ-K-1			18.67	Yes	Yes	3
MJ-L-2			18.09	Yes	Yes	3

MJ-MG-01			11.18	Yes	Yes	3
MJ-MG-02			14.08	Yes	Yes	3
MJ-S-2,J-5			29.14	Yes	Yes	3
MP-1		15.05		Yes	No	3
MP-3		20.10		Yes	No	3
NJ-1		23.11		Yes	No	3
NJ-2		20.67		Yes	No	3
NJ-3		32.76		Yes	No	3
NOW-1		14.94		Yes	No	3
NOW-2		14.42		Yes	No	3
NOW-3		91.97		Yes	No	3
NOW-3A		4.60		Yes	No	3
NOW-4		12.54		Yes	No	3
NOW-5		35.47		Yes	No	3
NOW-6		22.57		Yes	No	3
NOW-7		10.57		Yes	No	3
(b) (6) BSE			26.53	Yes	Yes	3
(b) (6) BW			40.16	Yes	Yes	3
(b) (6) FN			34.33	Yes	Yes	3
(b) (6) JN			38.39	Yes	Yes	3
(b) (6) LAV			35.00	Yes	Yes	3
(b) (6) LUKE			39.22	Yes	Yes	3
(b) (6) LUKW			17.83	Yes	Yes	3
(b) (6) SYN			32.18	Yes	Yes	3
(b) (6) UW			24.70	Yes	Yes	3
(b) (6) VIS			35.77	Yes	Yes	3
(b) (6) WN			28.63	Yes	Yes	3
(b) (6) WSE			7.39	Yes	Yes	3
(b) (6) WSW			8.08	Yes	Yes	3
PP-1	34.04			N/A	No	N/A
PP-2	62.03			N/A	No	N/A
RD-1-3	75.00			N/A	No	N/A
RIK-1	38.20			N/A	No	N/A
RIK-2	32.90			N/A	No	N/A
RM-01	60.93			N/A	No	N/A
RM-02	8.20			N/A	No	N/A
RM-03	2.98			N/A	No	N/A
RM-04	2.93			N/A	No	N/A
RM-05	4.03			N/A	No	N/A
RM-06	3.26			N/A	No	N/A
RM-07	10.35			N/A	No	N/A
RM-08	7.64			N/A	No	N/A
RM-09	3.45			N/A	No	N/A
RM-10	9.09			N/A	No	N/A
RM-11	2.67			N/A	No	N/A
RM-13	7.03			N/A	No	N/A

RMA-1		37.68		Yes	No	3
FOIA 1		18.50		Yes	No	3
FOIA 2		13.35		Yes	No	3
RR	38.08			N/A	No	N/A
RT-1	73.22			N/A	No	N/A
RT-2	20.77			N/A	No	N/A
RT-3	15.04			N/A	No	N/A
RVM-1	36.90			N/A	No	N/A
RVM-2	68.40			N/A	No	N/A
RVM-3	34.90			N/A	No	N/A
RWM-1	7.40			N/A	No	N/A
RWM-2	11.80			N/A	No	N/A
RWM-3	4.50			N/A	No	N/A
RWM-4	25.00			N/A	No	N/A
RWM-5	32.40			N/A	No	N/A
SF-H-10			18.10	Yes	Yes	3
SF-H-11-12			39.33	Yes	Yes	3
SF-H-1-2			36.96	Yes	Yes	3
SF-H-13			18.80	Yes	Yes	3
SF-H-3			25.20	Yes	Yes	3
SF-H-4-5			54.00	Yes	Yes	3
SF-H-6			41.00	Yes	Yes	3
SF-H-7-8			44.00	Yes	Yes	3
SF-H-9			6.28	Yes	Yes	3
SF-HO-1-2			38.61	Yes	Yes	3
SF-HO-3			11.71	Yes	Yes	3
SF-J-10			29.50	Yes	Yes	3
SF-J-1-2-3			67.40	Yes	Yes	3
SF-J-4-5-6-7			77.26	Yes	Yes	3
SF-J-8-9			36.88	Yes	Yes	3
SF-JAH-1			19.90	Yes	Yes	3
SF-JAH-2			39.77	Yes	Yes	3
SF-JW-1			48.00	Yes	Yes	3
SF-LC-1			29.97	Yes	Yes	3
SF-M-1-2			33.50	Yes	Yes	3
SF-M-3-4			40.50	Yes	Yes	3
TH-01E	6.86			N/A	No	N/A
TH-01W	8.06			N/A	No	N/A
TH-02	16.42			N/A	No	N/A
TH-05	9.80			N/A	No	N/A
TH-06	4.15			N/A	No	N/A
TH-07	4.88			N/A	No	N/A
TH-07R	0.00			N/A	No	N/A
TH-08	7.03			N/A	No	N/A
TH-09	0.64			N/A	No	N/A
TH-10	7.62			N/A	No	N/A
VAL-1		8.33		Yes	Yes	3
VAL-2		1.05		Yes	Yes	3

VANBV		23.33		Yes	Yes	3
VANH		18.50		Yes	Yes	3
VD-1		28.70		Yes	Yes	3
VD-2		5.00		Yes	Yes	3
VD-3		6.50		Yes	Yes	3
VD-4		6.10		Yes	Yes	3
VD-5		4.90		Yes	Yes	3
VD-6		46.81		Yes	Yes	3
VD-7		6.83		Yes	Yes	3
VD-8		16.63		Yes	Yes	3
VLI-1		2.25		Yes	Yes	3
VLI-2		28.92		Yes	Yes	3
VLI-3		38.70		Yes	Yes	3
	1791.99	2114.19	1260.87			

***** Shared land means fields that receive nutrients from more than one farm or nutrient source (e.g., manure, industrial wastewater, commercial fertilizer, septage, etc). These fields must be carefully tracked within the NMP.

Tillage and crop rotation information for all fields owned or rented or in 'agreements'

Please refer to Section 3.0 of plan (SNAP PLUS report) for tillage, crop rotation and land application schedules for specific fields.

Nutrient crediting requirements - NR 243.14(3)

When selecting manure and process wastewater application rates for all fields, Kinnard Farms Inc. has **taken into account the following factors:**

1. Soil nutrient levels prior to land spreading
2. Known nutrient applications from other sources, including:
   a. Commercial fertilizers
   b. Bio-solids
   c. First and second year manure and legume credits.
   d. Other sources of nutrients that are expected to be applied or have already been applied to fields.

Adjustments will be made to assumed nutrient credits based upon actual crop yields.

SWQMA application restriction option for each field AND procedures- NR 243.14(4)

For fields that manure will be incorporated or injected, Kinnard Farms Inc. will follow SWQMA option 1 - no application of manure or process wastewater within 25 feet of a navigable water, conduit to navigable water or wetland; and inject or immediately incorporate manure and process wastewater in all other areas within the SWQMA.

For fields that will have manure surface applied, such as actively growing crops like alfalfa, in a given crop year, Kinnard Farms Inc. will follow SWQMA option 5 – no application of manure or process wastewater within 100 feet of navigable water or conduit to navigable water.

Phosphorus delivery method (Soil Test P or P Index) and P management procedures for each field- NR 243.14(5)

Kinnard Farms Inc. will use the P Index for all fields within the NMP. Please refer to Section 3.0 of plan for appropriate reports from SNAP PLUS. All references to the use of the PI below apply.
Kinnard Farms Inc. will follow the P Management procedures listed below when applying manure and process wastewater to fields to demonstrate compliance with NR 243.14(5)(b) and applicable NRCS 590 requirements:

Fields with less than 50 ppm:

- N application rates allowed up to the N needs of the following crop or the N removal of the following legume crop.

OR

- Rotational average PI values for each field shall be 6 or lower. PI is calculated using up to 8 year rotation using current Wisconsin P Index calculations. P applications on fields with PI > 6 may be made only if additional P is needed according to UWEX soil fertility recommendations.

Fields with soil test P between 50-100 ppm:

- P application shall not exceed the total crop P removal for crops to be grown over maximum 8 year rotation.

OR

- Rotational average PI values for each field shall be 6 or lower. PI is calculated using up to 8 year rotation using current Wisconsin P Index calculations. P applications on fields with PI > 6 may be made only if additional P is needed according to UWEX soil fertility recommendations.

Fields with soil test P between 100-200 ppm:

- The rotational average P Index value for the crop rotation or for the next 4 year period, whichever time period is less, will be calculated.
- When P Index is > 6, manure application(s) to field are prohibited.
- When P Index is < 6, manure applications allowed with P drawdown by 50% cumulative crop removal over a maximum 4 year rotation will be implemented.

Fields with soil test P greater than 200 ppm:

- P applications from manure and process wastewater prohibited, unless approved by DNR.
- The planned average WI P Index value for the crop rotation or for the next 4 year period, whichever time period is less, will be calculated.
- P drawdown by 50% cumulative crop removal over a maximum 4 year rotation will be implemented.

Fields: (None are listed) are currently over 200 ppm phosphorus. These fields can receive manure with DNR approval because they meet the requirements in NR 243.14(5)(b)2. for manure applications regarding phosphorus delivery, P Index and P drawdown.

Soil Test P fields

All fields using soil test P will be included within a current conservation plan for Kinnard Farms Inc., or use the erosion assessment tools included with the P Index model. Kinnard Farms Inc. conservation plan meets the NRCS 590 criteria (V.C.2.b) below and addresses all soil erosion consistent with current crops and management or uses the erosion assessment tools included within the WI P Index model.

NRCS 590 Conservation Plan Criteria - (V.C.2.b)

The plan must be developed by and field verified by a conservation planner to document crop management and the conservation practices used to control sheet and rill erosion to tolerable levels (T) and to provide treatment of ephemeral soil erosion.

- The conservation plan must be signed by the land operator and approved by the county land conservation committee or their representative.
- A conservation planner must develop conservation plans using the minimum criteria found in the USDA, NRCS National Planning Procedures Handbook and the WI Field Office Technical Guide.
- In crop fields where ephemeral erosion is an identified problem, a minimum of one of the following runoff reducing practices shall be implemented:
  - Install/maintain contour strips and/or contour buffer strips.
  - Install/maintain filter strips along surface waters and concentrated flow channels that empty into surface waters that are within or adjoin areas where manure will be applied.
  - Maintain > 30% crop residue or vegetative cover on the soil surface after planting
  - Establish fall cover crops.

All fields using soil test P that have a high potential to deliver phosphorus to 303(d) listed waters impaired by nutrients or outstanding and exceptional resource waters, shall be managed by Kinnard Farms Inc. to ensure:

Soil test P levels shall not increase over a crop rotation unless DNR provides written approval and same fields that have soil test phosphorus below optimum levels, soil test P levels shall not increase over a rotation above the optimum level for the highest demanding phosphorus crop in a rotation.

Field proximity to nutrient impaired or outstanding/ exceptional waters - NR 243.14(5)

The production site is located within the Kewaunee River Watershed, Lake Michigan Drainage Basin.. See Section 2.0 for the cropland base watershed map.

This section is required if using soil test phosphorus method. However, Kinnard Farms Inc. is using the Wisconsin Phosphorus Index for nutrient management planning therefore Kinnard Farms Inc. is not

required to complete this section. Regardless, maps are included for a reference showing the land base in relationship to these waters will be attached in section 2.0 of this NMP.

DNR 2008 impaired waters list: http://dnr.wi.gov/org/water/wm/wqs/303d/2008/2008Updates.htm
DNR impaired or outstanding or exceptional waters:
http://dnrmaps.wisconsin.gov/imf/imf.jsp?site=SurfaceWaterViewer)

Identification of sites for winter (frozen or snow covered ground) spreading – NR 243.14(8)

For compliance with NR 243.14(8) winter spreading sites requirement, fields DEB(57.1 ac) and DSB (37.8ac) have been selected for winter application(s) if application(s) of liquid manure become necessary. According to the 3.6 Spreadable Acres table located in Section 3 Reports, 4,451 acres of land is available in case emergency applications are warranted. These fields have planned manure applications in the spring, summer and fall, but can potentially be used as a winter spreading field at any given time if needed. All fields have been evaluated by Kinnard Farms Inc. to meet the NR 243 criteria in Tables 4 and 5 for manure and criteria in 214.17(2) and (6) for process wastewater. Kinnard Farms Inc. has also determined this field represents a low pollutant delivery to waters of the state and has a winter acute loss index value of 4 or less using the Wisconsin Phosphorus Index. In addition, Kinnard Farms Inc. will evaluate this same field at the time of manure application to determine if conditions are suitable for applying manure and complying with the requirements of NR 243.14(8). Fields RIK-1 and RIK-2 will be used for snow stacking in winter times when snow removal is needed.

Solid Manure

Table 4-Restrictions for Surface Applying Solid Manure on Frozen and Snow Covered Ground

Criteria	Restrictions for fields with 0-6% slopes	Restrictions for fields with slopes > 6% and up to 9%	Restrictions for fields with slopes greater than 9%
Required fall tillage practice prior to application	Chisel or moldboard plow, no-till or a department approved equivalent[A]	Chisel or moldboard plow, no-till or department approved equivalent[A]	Not allowed
Minimum % solids allowed	12%	> 20%	Not allowed
Application rate (cumulative per acre)	Not to exceed 60 lbs. P_2O_5 per winter season, the following growing season's crop P_2O_5 budget taking into account nutrients already applied, or phosphorus application restrictions specified in a department approved nutrient management plan, whichever is less	Not to exceed 60 lbs. P_2O_5 per winter season, the following growing season's crop P_2O_5 budget taking into account nutrients already applied, or phosphorus application restrictions specified in a department approved nutrient management plan, whichever is less	Not allowed
Setbacks from surface waters	No application allowed within SWQMA	No application allowed within 2.0 x SWQMA	Not allowed
Setbacks from downslope areas of channelized flow, vegetated buffers, and wetlands	200 feet	400 feet	Not allowed
Setbacks from direct conduits to groundwater	300 feet	600 feet	Not allowed
A – All tillage and farming practices shall be conducted in accordance with the following requirements; 0-2% slope = no contouring required, >2-6% slope = tillage and practices conducted along the general contour, >6% slope = tillage and farming practices conducted along the contour. The department may approve alternative tillage practices on a case-by-case basis in situations where conducting practices along the contour is not possible. Allowances for application on no-till fields only apply to fields where no-till practices have been in place for a minimum of 3 years.			

Liquid Manure

Table 5–Frozen and Snow Covered Ground Restrictions – Emergency Surface Applications of Liquid Manure

Criteria	Restrictions for fields with 0-2% slopes	Restrictions for fields with >2-6% slopes	Restrictions for fields with slopes greater than 6%
Required fall tillage practice prior to application	Chisel or moldboard plow or department approved equivalent[A]	Chisel or moldboard plow or department approved equivalent[A]	Not allowed
Application rate (cumulative per acre)	Maximum application volume of 7,000 gallons per acre per winter season, not to exceed 60 lbs. P_2O_5, the following growing season's crop P_2O_5 budget taking into account nutrients already applied or other phosphorus application restrictions specified in a department approved nutrient management plan, whichever is less	Maximum application volume of 3,500 gallons per acre per winter season, not to exceed 30 lbs. P_2O_5, the following growing season's crop P_2O_5 budget taking into account nutrients already applied, or other phosphorus application restrictions specified in a department approved nutrient management plan, whichever is less	Not allowed
Setbacks from surface waters	No application allowed within SWQMA	No application allowed within SWQMA	Not allowed
Setbacks from downslope areas of channelized flow, vegetated buffers, wetlands	200 feet	200 feet	Not allowed
Setbacks from direct conduits to groundwater	300 feet	300 feet	Not allowed
A – All tillage and farming practices shall be conducted along the contour in accordance with the following requirements; 0-2% slope = no contouring required, >2-6% slope = tillage and practices conducted along the general contour. The department may approve alternative tillage practices on a case-by-case basis in situations where conducting practices along the contour is not possible			

Manure Stacking – NR 243.141

At this time Kinnard Farms Inc. does wish to headland stack solid type manure if necessary. Pre selected sites have been approved and can be used if necessary. Fields RIK-2, GT-1, GT-2, and GT-3 are approved sites for solid stacking. If in the future the dairy wished to headland stack solid manure in other locations, all manure stacking sites shall be selected for compliance with all requirements of NR 243.141. Please refer to Section 5.0 of plan for additional manure stacking site(s) information and Section 2.0 for maps of manure stacking sites when in use.

Documentation of 180 days storage and methods for maintaining storage - NR 243.14(9) and NR 243.17(3)

Please refer to the summary below for manure storage capacity calculations. Please refer to Section 3.0 of plan for land application schedules for specific fields – this schedule demonstrates how Kinnard Farms Inc. will maintain 180 days storage capacity over time.

Waste storage facilities have a total 21,000,000 gallons of liquid capacity and 500 tons of solids capacity. Manure production is 34,000,000 gallons this gives the dairy 222 days of liquid capacity.

General Manure and process wastewater application requirements – NR 243.14(2)(b)(1-13)&(c-f)

Kinnard Farms Inc. will take several actions to ensure all manure and process wastewater is land applied in compliance following general landspreading requirements of NR 243.14:

-No ponding on application site.

-During dry weather, no runoff from the application site, nor discharge to waters of the state through subsurface drains.

-No causing fecal contamination of water in a well.

-Unless rain event is greater than 25 yr/24 hr event and dairy complies with NMP and WPDES permit, no runoff from the application site, nor discharge to waters of the state through subsurface drains due to precipitation or snowmelt.

-No application on saturated soils.

-Maximize use of available nutrients, prevent delivery of manure and process wastewater to waters of the state, and minimize the loss of nutrients and other contaminants to waters of the state to prevent exceedances of groundwater and surface water quality standards and to prevent impairment of wetland functional values.

-Retain nutrients in the soil with minimal movement.

-No application within 100 feet of direct conduits to groundwater.

-No applications within 100 feet of private well or non−community system and 1000 feet of community well.

-No application on fields with soils that are 60 inches thick or less over fractured bedrock when ground is frozen or where snow is present.

-No application when snow is actively FOIA such that water is flowing off a field.

Please refer to Section 2.0 of plan for spreading maps that visually describe how the dairy will meet many of these general spreading requirements.

To demonstrate compliance with the NR 243.14 general land application requirements above, Kinnard Farms Inc. will complete, on an ongoing basis, map and field verification procedures (listed below) to ensure spreading maps are accurate (including soil types, slopes and slope lengths), SWQMA or well setback distances are followed and prohibited conditions/features on fields are identified and avoided when spreading manure or process wastewater to NMP fields. The procedures demonstrate how land application activities will be in compliance with NR 243.14 or NRCS 590 restrictions throughout the permit term. The prohibited conditions/features that Kinnard Farms Inc. will evaluate on each field include: ephemeral erosion or concentrated flow channels, saturated soils, intermittent and perennial streams, grassed waterways, wetlands, lakes, drinking wells, areas of field with soil type indicating the potential for bedrock or groundwater within 24 inches of field surface, wells and other direct conduits to groundwater - NR 243.14(2)(b)(3),(5),(6), (7-12). These areas have been inventoried and marked on restriction maps (see Section 2.0 of plan). Kinnard Farms Inc. will maintain written and/or visual (i.e. photo) records of ongoing field and map verification actions to demonstrate compliance with NR 243.14 requirements. Please refer to Section 5.0 of plan for an example of the required record keeping log. All records will be maintained at the dairy cropping office.

Field and Map Verification Procedures

Prior to spreading manure onto fields, Kinnard Farms Inc. will complete the following map and field verification procedures to ensure all manure spreading will be in compliance with NR 243 and 590 criteria:

Spreading maps will be reviewed by Kinnard Farms Inc. Operations Manager to identify all restricted or prohibited features and setback distances in field.

Fields will be inspected for restricted or prohibited features; any new conditions/features will be identified.

Once identified, prohibited field features will be avoided and setback distances (as depicted on spreading maps or in NR 243 or NRCS 590) will be measured and followed during manure spreading.

Spreading maps will be updated with any new prohibited/restricted field features or conditions.

A log will be kept with the NMP to track the map and field verification procedures listed above. The log will track:

- date(s) review took place
- person(s) involved.

- fields verified
- any new field features or conditions identified on fields
- photos or other documentation of field features or conditions reviewed

Avoiding manure or process wastewater field runoff or ponding– NR 243.14(2)(b)(1), (2)&(6).

Please refer to field and map verification procedures and NRCS 590 requirements for runoff and ponding.

Surface applications & precipitation forecast for runoff within 24 hours – NR 243.14(2)(b)(13).

For this NMP, ***surface*** applications of manure will not be completed when rain events above 1.5 inches are forecasted within 24 hours of the time of planned applications. Surface application means manure that is applied and left on the surface of the field. Surface application does not mean manure that is surface applied and then incorporated into the soil. Prior to manure applications to fields, www.accuweather.com or any other recognized weather information source, will be used to track weather forecast data. This information will be used determine the risk for forecasted precipitation to cause run-off from fields. Weather forecast data will be printed or saved to disc and kept with the NMP. All weather forecast data will be submitted with annual reports as an attachment.

Drain tile fields & tile discharges to surface waters -NR 243.14(2)(b)(2),(4)&(6) and NRCS 590 (V.A.1.k)

Fields with known drain tile: DUV, GT-2, PP-3, RM-2,3,4,5,6,7, and RVM-2 Maps for tile outlets are available for the fields listed above. Before manure is applied on these or any fields the tile outlets will be located to the best ability possible. Maps will be located in Section 2.

Drain tile discharges from fields to surface waters are not allowed under NR243. Such discharges will be prevented or responded to by Kinnard Farms Inc. via the following procedures:

Prior to spreading manure onto fields with drain tiles:

- The following UW Discovery Farm Drain Tiles documents will be reviewed by Kinnard Farms Inc.:
  Understanding and Locating Drain Tiles
  http://www.uwdiscoveryfarms.org/pdf/pubsnewsres/DF-TD1.pdf
  Tile Talk with Discovery Farms, Third Edition, Pages 4-5
  http://www.uwdiscoveryfarms.org/pdf/pubsnewsres/newsltr1006.pdf

- Spreading maps will be reviewed to identify known drain tile locations.

- Fields will be inspected for drain tile presence or outlets; any new tile outlets/subsurface drainage systems will be identified.

- All tile outlets will be visually checked for flow and water conditions (e.g., clear, colored, foam, odor, etc).

- Results of all visual tile monitoring will be tracked – using form in Appendix 1 - and kept with NMP.

During and after manure spreading on fields with drain tiles, best management practices will be followed:

- Visual inspection of tile outlets for flow and water conditions (e.g., clear, colored, foam, odor, etc.)
- Containing manure or process wastewater tile discharges from release into waterway(s)
- Notifying DNR of any spills/discharges to waterways from tiles
- Update NMP spreading maps or narrative to maximize accuracy
- Results of visual inspections of tiles will be tracked – using form in Appendix B of this narrative and kept with NMP.

Please also refer to NRCS 590 requirements for field runoff, ponding and drainage to subsurface tiles.

Manure applications to areas of fields with shallow groundwater or bedrock – NR 243.14(2)(b)(7).

NR 243 prohibits manure applications on areas of fields that have groundwater or bedrock within 24 inches of the field surface at time of application. Kinnard Farms Inc. will demonstrate compliance with this prohibition by implementing DNR guidance, "Nutrient Management - CAFO Applications on Shallow Groundwater Soils" dated March 2009. Please refer to Appendix C of this narrative for the DNR guidance

Daily Spreading Log and Annual Reports for DNR – NR 243.19.

Kinnard Farms Inc. will maintain daily spreading log for all manure or process wastewater applications to NMP fields for compliance with NR 243.19. The daily spreading log will also be used to complete required annual reports submitted to DNR. Kinnard Farms Inc. recognizes that the daily spreading log and annual reports are essential to document actual management practices used by the permittee and the resulting soil erosion and water quality impacts on specific fields. Kinnard Farms Inc. will use a newer version log sheet which allows for documentation of field verifications and soil temperatures, where required. An example of this form is in Section 5.0 of this plan. The actual application logs will be maintained at the farm's cropping office. Please also refer to NRCS 590 requirements for Annual Updates to NMP.

Manure spreading equipment calibration and Manure concentration testing – NR 243.19.

Kinnard Farms Inc. shall conduct or require periodic inspections and ongoing calibration of landspreading equipment to detect leaks and ensure accurate application rates for manure and process wastewater. Initial calibrations shall be followed by additional calibration after any equipment modification or after changes in manure or process wastewater consistency and/or source. At a

minimum, calibration of all manure spreading equipment used by Kinnard Farms Inc. shall be completed annually. Kinnard Farms Inc. will follow UW extension web page guidance for Calibration of Manure Application Equipment. : http://www.extension.org/pages/Calibration_of_Manure_Application_Equipment

Kinnard Farms Inc. shall analyze manure and process wastewater applied to fields in accordance with WPDES permit conditions. Sampling shall be completed for all sources of manure and process wastewater. All sources of manure and process wastewater shall be analyzed on at least an annual basis for Nitrogen, Phosphorus, and percent solids in years where manure and process wastewater is applied. Samples collected shall be representative of the manure or process wastewater applied to fields. Kinnard Farms Inc. will follow sampling methods found in UW publication A3769, Recommended Methods of Manure Analysis: http://learningstore.uwex.edu/Assets/pdfs/A3769.pdf

Wisconsin NRCS 590 Requirements

Dominant Critical Soil.

Each field in this NMP is managed to meet NRCS dominant critical soil criteria:
http://www.datcp.state.wi.us/arm/agriculture/land-water/conservation/nutrient-mngmt/pdf/ChoosingCriticalSoilType.pdf
The dominant critical soil is the most erosive soil that covers at least 10% of the field area. The dominant critical soil type was selected for all fields listed in the NMP to ensure corresponding rotational T – tolerable soil loss - values for each field are accurate for compliance with NRCS 590 requirements. Please refer to Section 2.0 for field soil maps and Section 3.0 for the Snap Plus Field Data/590 Assessment Report of plan for this information.

T – Tolerable soil loss.

Each field in this NMP is managed to meet T – tolerable soil loss - over the crop rotation. T values were calculated using NRCS RUSLE 2 model. No nutrient applications (manure, fertilizer) are allowed on fields that fail to meet T. Erosion controls shall be implemented so that tolerable soil loss (T) over crop rotation will not be exceeded on fields that receive nutrients. Please refer to Section 3.0 of plan for information showing each field's tolerable and actual soil loss.

Soil Testing.

Polenske Agronomic Consulting Inc. will utilize AgSource Soil and Forage Laboratory, 106 North Cecil Street, Bonduel, Wisconsin 54107, phone# 715-758-2178, for soil testing at Kinnard Farms Inc., AgSource is an approved soil testing lab certified by the Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP).
Each field in the NMP is managed for compliance with NRCS A2100 soil testing criteria:
http://www.datcp.state.wi.us/arm/agriculture/land-water/conservation/nutrient-mngmt/pdf/uwex-a2100.pdf**.**

Accordingly, all fields in this NMP either meet or are managed to meet A2100 criteria over time. Please refer to Section 4.0 Soil Test Summary, of plan for this information. Sometimes field boundaries change or are more accurately mapped resulting in small changes in acreage. This may result in a field requiring one more sample to meet the 5 acres per sample recommendation set forth in UW A2100. Spreadable acres are used for acres per field in snap plus. Soil sampling GIS mapped boundaries may vary from FSA acres and the number of samples taken off these acres. If this situation occurs, Kinnard Farms Inc. will continue to use the current average soil analysis for the given field while limiting phosphorus applications to equal or less than rotational crop removal for the planned rotation years as long as the field is under 100 ppm soil test P. If a field has no soil test results then Kinnard Farms Inc. will implement one of the following:

- Manure will not be applied to field;
- Field will be managed as if P levels are greater than 100 ppm P (ie.101 ppm P) according to NR 243.14(5) criteria for all manure applications to field.

Application and budgeting of nutrients – consistent with NRCS 590 standard and soil fertility recommendations found in A2809.

Each field in the NMP is managed to address the source, rate, timing, form and method of application and budgeting of all nutrient sources (i.e., including soil reserves, commercial fertilizer, manure, organic byproducts –animal mortality and composting materials - legume crops and crop residues) generated or accepted by Kinnard Farms Inc. and applied to fields. Please refer to Section 3.0 of plan for this information.

Mortality Management

Employees are instructed to follow these steps:

1. Contact farm manager
2. Remove animal from pen or barn and place in designated location.
3. Farm manager will contact mortality disposal contractor for pickup.

Kinnard Farms Inc. currently contracts with multiple mortality disposal providers to pickup any animal mortalities.

Sandy Bay Mink Ranch 920-755-2843

920-733-7201

Records of mortalities are kept on farm via the Dairy Comp 305 program or similar program in the farm office.

Other sources of nutrients to be land applied (NRCS 590 requirement).

Please refer to Section 3 manure production report of plan for calculations/analysis for table values and Section 3.0 of plan for specific fields land application amounts and schedules (e.g., spring, summer or fall).

Other Soures of Nutrients

Year	Total Liquid Manure and wastewater (gls) Generated	Total Liquid leachate and water (gls)	Total Solid Manure (tons) Generated
2012	34,692,338	2,963,250	4,209
2013	34,692,338	2,963,250	4,209
2014	51,570,850	2,963,250	383
2015	59,162,850	2,963,250	767

2016	68,943,938	2,963,250	1,437

Crop Yield Goals.

Each field in the NMP is managed according to yield goals that are attainable by the farm under average growing conditions and established using multi year documented yields kept by the farm. Farm yield goals in this NMP shall not be set higher than 15% above the previous 3-5 year average. Absent field/farm specific yield goals data, yield goals in this NM plan will be set using Wisconsin county average crop yields found at National Agricultural Statistics Service:
http://www.nass.usda.gov/Data_and_Statistics/index.asp
Please refer to the reports in Section 3.0 of this NMP for yield goal information. NASS has no yield data for irrigated crops, a historic value was used if there was no NASS irrigated crop data available.

Records of soil and manure testing results.

Kinnard Farms Inc. has completed and retained records showing recent soil testing results. Please refer to Section 4.0 of plan for this information. Soils tests are completed at a maximum of every four years. Manure is analyzed according to the schedule set forth in Kinnard Farms Inc. WPDES Permit, and will be sampled when manure is hauled.

Fields with concentrated flow channels resulting in reoccurring gullies or ephemeral erosion.

Kinnard Farms Inc. will evaluate fields on an ongoing basis each year for presence of flow channels or other types of ephemeral soil erosion. If fields show evidence of concentrated flow channels resulting in re-occurring gullies or ephemeral erosion, the following actions will be taken by the farm:

- Spreading maps will be updated to reflect areas with concentrated flow channels;
- Manure will not be spread on areas of fields with concentrated flow channels, until perennial vegetative cover is established in all areas of concentrated flow;
- One or more NRCS 590 runoff reducing practices for crop fields with ephemeral erosion will be selected and implemented. Practices selected and implementation dates will be recorded and kept with this NMP.
- Once vegetated flow channels/grassed waterways are established within fields, such areas will be maintained to perform their intended function and manure will not be applied within these areas.

No fields on Kinnard Farms Inc. are currently showing reoccurring gullies or ephemeral erosion.

Fields with high potential for N leaching to groundwater - soil temperature, application rate and timing restrictions

Fields in this NMP have been evaluated for soils with high potential for N leaching to groundwater for compliance with NRCS 590 requirements. Please refer to Section 2.0 and 3.0 of plan for this information.

When manure is applied to fields with soils classified as having a high potential for N leaching to groundwater and the soils are > 50 degrees F, the potential exists for rapid N mineralization. The risk for N mineralization and loss (via leaching to groundwater) is a concern the farm will manage. As such, Kinnard Farms Inc. will measure soil temperatures prior to field applications in late summer or fall. Soil temperature logs will be kept with manure spreading records/reports and maintained over time for compliance recordkeeping requirements. The farm will follow the following procedures for compliance with NRCS 590 soil temperature, application rate and timing restrictions:

If any fields are found to be > 50 degrees F, the dairy will follow section V, B, 2 of NRCS 590 standard. Some or all of the following best management practices may be implemented:

a. Use a nitrification inhibitor with liquid manure and limit N rate to 120 pounds available N per acre.

b. Delay applications until after September 15 and limit available N rate to 90 pounds per acre. (The balance of the N (as needed by the crop and identified in the NMP) can then be applied in the spring. Kinnard Farms Inc. has 8 months of manure storage available, which is more than required by NR 243. This additional storage will be more than adequate to store manure in the event that only 90 pounds of N can be applied due to warm soil conditions.)

c. Apply to fields with perennial crops or fall− seeded crops. N application shall not exceed 120 pounds available N per acre or the crop N requirement, whichever is less.

If any fields are found to be < 50 degrees F, the dairy will follow section V, B, 3 of NRCS 590 standard.

Field Inspection and Response Procedures for manure ponding, runoff from fields or drainage to subsurface tiles

Kinnard Farms Inc. will evaluate field and weather conditions prior to and during mechanical applications of **manures, organic byproducts and fertilizer** to ensure that applied material(s) do not cause ponding, runoff, or drainage to subsurface tiles. The following response procedures will be followed by Kinnard Farms Inc. if/when ponding, runoff or drainage to subsurface tiles occurs during and/or after applications to fields:

Stop application immediately (if field application not finished)

Containment measures (e.g., earth berms, pumps, temporary pits, tillage, or incorporation) will be implemented to prevent off-site movement from field.

Changes in application rate, method, depth of injection or timing to the field may be implemented during any future application to eliminate ponding, runoff or drainage to subsurface tiles.

Farm shall notify DNR of any spills or accidental release to comply with Ag Spill Law (289.11) or term of WPDES permit.

Annual Updates.

This NMP will be updated annually. Each NMP annual update for Kinnard Farms Inc. shall include: records/documentation of all soil or manure analyses as well as crops, tillage, nutrient application rates, and methods actually implemented on each field that receives nutrients. Annual updates are essential to document actual management practices and resulting soil erosion and water quality impacts on specific fields.

Monitoring and Inspection Program

Within 90 days of the effective date of a WPDES permit, the permittee shall submit a proposed monitoring program that includes information on the use of models, visual inspections, rainfall records, or other proposed methods to determine compliance with the effluent limitation specified in the General Discharge Limitations and Performance Standards subsection of the WPDES permit. Visual inspections shall be completed by the permittee or designee beginning on the effective date of the permit and in accordance with the following frequencies:

- Daily inspections for leakage of all water lines that potentially come into contact with pollutants or drain to storage or containment structures or runoff control systems, including drinking or cooling water lines.
- Weekly inspections to ensure proper operation of storm water diversions and devices that channel contaminated runoff to storage or containment structures.
- Weekly inspections of storage and containment structures (e.g., composting and leachate containment systems and manure storage structures). For liquid storage and containment facilities, the berms must be inspected for leakage, seepage, erosion, cracks and corrosion, rodent damage, excessive vegetation and other signs of structural weakness. In addition, the level of material in liquid storage and containment facilities shall be measured and recorded in feet or inches above or below the freeboard level. This measurement shall be based on a depth gauge, if available, or estimated if a depth gauge is not available. The permittee shall also record the date, time and estimated volume of any overflows of liquid storage or containment facilities.
- Quarterly inspections of outdoor animal lots, raw material storage areas, manure and process wastewater handling devices and practices.
- Periodic inspections of land application equipment for leaks. Frequency of land application equipment inspections shall be specified in the monitoring program.

Corrective Actions: Corrective actions shall be taken as soon as practicable to address any equipment, structure or system malfunction, failure or other problem identified as a result of monitoring

or inspections. The permittee shall contact the Department if the permittee fails to or is unable to take corrective actions within 30 days of identifying a malfunction, failure or other problem.

Records: The permittee shall maintain records on site of all completed monitoring and inspections for Department review. In addition, the permittee shall maintain records associated with mortality management. Summaries of these records shall be submitted to the Department in accordance with requirements for Annual Reports in the Standard Requirements. Refer to the Schedules section and the Standard Requirements section for additional details. Any discharges to surface water shall be reported as outlined in ch. NR 205.07(1), Wis. Adm. Code.

Kinnard Farms Inc. will utilize their own proprietary daily, weekly and quarterly inspection forms that meet NR 243 Standards. These documents will be kept in the main office area and will be submitted to DNR in an Annual Report.

Other Record Keeping

Kinnard Farms Inc. is required to keep other records which include:

- Manure Spill Logs
- Manure Transfer Logs
- Employee Training Logs
- Weather Information
- Manure spreader maintenance & calibration

This information will be kept in the farm's main office along with the other required field record keeping requirements.

Changes to the operation that are planned to occur during upcoming permit term:

None at this time.

Changes to the operation that will be necessary to comply with NR 243.14 Nutrient Management land application requirements (e.g., general requirements – 243.14.(2)(b)1-13, fields with drain tiles, 180 days storage).

None at this time.

Description of permanent spray irrigation systems AND any other land spreading or treatment systems

Kinnard Farms Inc. does not use any irrigation systems at this time.